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In 1829, Louis-René Villermé famously observed that ‘human height becomes greater and growth more rapid ... as the country is richer.... The circumstances which accompany poverty delay the age at which complete stature is reached and stunt adult height’ (qu. in Floud, Harris and Hong 2014: xiii). This observation stands at the heart of the study of anthropometric history and, more broadly, the relationship between economics and human biology. Anthropometric history uses height and other anthropometric indicators to examine changes in the health and welfare of past generations. The encounter between economics and human biology builds on this to explore the relationship between economic factors and human wellbeing in both past and present. As this volume demonstrates, the field of economics and human biology has grown rapidly in recent years, and encompasses a wide range of disciplinary approaches.

The relationship between anthropometric history and economics and human biology can be regarded as both a strength and a weakness. It gives the current volume a particularly strong focus on issues relating to height, weight and obesity. However, the volume has rather less to say about other health indicators, such as morbidity or mortality, or the impact of economic factors on such issues as healthy life expectancy. This reflects the way in which the field itself has so far developed. Issues such as the impact of economic change on fertility or processes of human ageing, or the impact of changing disease patterns on the future of health care, may also be somewhat under-represented.

The volume also raises questions about the relationship between human biology and the study of health and wellbeing. The editors argue that their perspective ‘differs from health and health economics insofar as health is usually defined in terms of the absence of disease, whereas the Economics and Human Biology research programme is concerned with the functioning of the human biological system and how it is impacted by its socioeconomic environment’ (p. 3). Although the editors’ main aim is to distinguish the field of Economics and Human Biology from that of health economics, their description of the ‘normal’ definition of ‘health’ is contradicted by Baltica Cabieses and her coauthors in the one of the volume’s later chapters. As they point out, it is now nearly seventy years since the World Health Organisation defined health as ‘a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity’ (p. 246).

As the editors explain in their introductory chapter, the book has three interlocking aims. The first is to explore the impact of economic factors on a range of biological indicators in both past and present. The second is to examine the reverse relationship – the impact of biological wellbeing on economic performance and development. The third is ‘to introduce the reader to developmental aspects and policy, particularly correlates of malnutrition and poverty’ (p. 5). Although there is perhaps a slight bias in favour of the United States, the book draws on a very wide range of evidence from virtually all parts of the globe.

The *Handbook of Economics and Human Biology* is divided into three parts. Part I includes a range of chapters which cover different conceptual, empirical and methodological issues. In Chapter 1, Jere Behrman highlights the significance of the first thousand days from the moment of conception to a child’s second birthday, whilst also acknowledging the extent to which critical events in later life also influence a person’s health and wellbeing. In Chapter 2, Richard Steckel provides an overview of research into the measurement of wellbeing and its

relationship to the history of living standards. Prashant Bharadwaj and Tom Vogl focus directly on the relationship between ‘crises’ and human biology, and make the point that ‘children, who are never complicit in creating crisis, carry the burden of exposure for the rest of their lives’ (p. 64). Nikola Koepke highlights the role which archaeological findings have played in extending our understanding of anthropometric change in the very long run. Gregory Colman and Dhaval Dave follow a more methodological approach in exploring the application of different econometric techniques to the study of the relationship between economic factors and health outcomes.

If the collective aim of these chapters is to ‘set the scene’, the second part of the volume focuses primarily on the use of different anthropometric indicators and the economic (and other) factors which underpin them. A number of the chapters focus primarily or exclusively on stature. Richard Steckel discusses the long-running debate over the height of US slaves and its relationship to arguments about human beings’ capacity for ‘catch-up growth’. Deborah Oxley highlights the extent to which the overwhelming majority of historical studies focus on male heights and emphasises the need for separate investigations into the heights and weights of girls and women. Three of the chapters devote considerable attention to the relationship between inequality and wellbeing. Both Matthias Blum (Chapter 8) and Nicholas Meinzer and Jörg Baten (Chapter 14) explore this theme in a historical context whilst Baltica Cabieses, Kate Pickett and Richard Wilkinson’s chapter has a more contemporary focus. Meinzer and Baten also examine a series of themes in the history of human height over the longer term.

Although anthropometric historians have often focused on height as a measure of net nutrition, more effort has been made in recent years to unearth data on human weight. This is particularly important in the present day as concern about the rise in global obesity increases. It is therefore not surprising that many of the

chapters should focus on this issue. Scott Carson (Chapter 6) and Darius Lakdawalla and Julian Reif (Chapter 7) study changes in the body mass index in both past and present, with particular reference to the USA. Lakdawalla and Reif pay particular attention to the more immediate causes of obesity, such as proximity to fast food outlets, in contrast to the work of authors such as Avner Offer or Kate Pickett and Richard Wilkinson, who have focused on more ‘fundamental’ causes such as inequality or economic insecurity. Katrin Kromeyer-Hauschild and her coauthors emphasise the limitations of BMI as a measure of obesity, whilst Asher Rosinger and Ricardo Godoy look at changes in both height and weight among ‘native’ populations and Chad Meyerhoefer and Muzhe Yang explore the interrelationships between poverty and obesity in the ‘developed’ world.

Alan Rogol’s chapter stands out in this section, partly because of its strong medical orientation (Rogol is Professor of Paediatrics and Pharmacology) and partly because of the extent to which is explicitly concerned with the relationship between environmental and genetic factors and their impact on human growth. As such, it provides a natural bridge to the opening chapters in Part III.

If the second part the volume is primarily concerned with the biological *outcomes* of economic forces, Part III considers the reverse relationship – the impact of biology on economic fortunes and development. However, there are inevitably some overlaps. Susan Averett and Yang Wang discuss the ‘double burden’ of both overnutrition and undernutrition but pay much more attention to the determinants of these conditions than their consequences. A similar point could also be made in relation to Peter Ward’s chapter on birth weights as *indicators* of human welfare. Both Dejun Su (Chapter 23) and Avner Offer (Chapter 28) consider the underlying economic and social causes of variations in obesity levels. Su concludes that the association between income inequality and obesity prevalence ‘virtually disappears when the United States and Mexico ... are excluded from the analysis’ (p. 497),

whilst Offer argues that recent studies have tended to reinforce his emphasis on the importance of 'welfare regimes' (p. 599).

Although there are clear overlaps between Parts II and III, most of the remaining chapters in this section are more obviously focused on the consequences of different biological states rather than their causes. Stephen Lehrer discusses a range of 'biomarkers' and their social, political, economic and medical outcomes. This chapter is notable for considering a somewhat wider range of biological indicators (including, for example, age of menarche) than many of the chapters in this volume. It links nicely with George Wehby's chapter, which examines the ways in which genetics may influence behavioural responses to different health improvement strategies. This chapter is followed by Jere Behrman's discussion of the role of twin studies in economics. Although recent advances in genetic science have provided much more sophisticated ways of distinguishing between 'nature' and 'nurture', Behrman argues that twin studies still have a useful role to play in economic analysis.

Several of the chapters in this section consider the relationship between either height or weight and economic outcomes. In many parts of the world, it is generally acknowledged that taller people tend to earn more and enjoy higher social status, whereas shorter people, and people who are more obese, tend to earn less. However, as Olaf Hübler explains, the mechanisms which underpin these relationships remain unclear. One might argue that people who are visibly overweight or obese are more likely to suffer from discrimination, but Jane Greve rejects this argument and concludes that the association between obesity and earnings is sufficiently strong to justify anti-obesity (as opposed to anti-discrimination) strategies. Jay Zagorski draws an important distinction between income and wealth and explores the ways in which either the acquisition of weight or its control can act as markers of social prestige in different societies. Harold

Alderman and David Sahn explore the public and private returns to investments in better health. They draw on a range of both historical and contemporary studies to illustrate the relationship between health and income.

Whilst most of the chapters in this section examine the relationship between biological and economic indicators, at least two are also concerned with the relationships between health indicators. Elizabeth Frankenberg and her coauthors consider a wide range of health indicators, including not only height, weight and BMI, but also blood pressure, nutrient intake and various blood-based markers of health risks. They draw particular attention to the association between obesity and the incidence of non-communicable diseases and the personal and economic costs which these might impose. Karri Silventoinen highlights the relationship between children's growth and susceptibility to future disease. He emphasises the ways in which 'inadequate nutrition in early life' can lead to increased risks decades later, whilst also acknowledging the extent to which 'excess nutrition has replaced undernutrition as a major risk factor for future health' (p. 616). This theme is also picked up by Florencia Torche and Calton Conley. They emphasise how 'exposures during the prenatal period have long-lasting consequences for health and cognition, education, earnings and other determinants of economic wellbeing' (p. 652) and discuss a number of strategies for combating the adverse effects of low birth weight.

The two remaining chapters in this section adopt different approaches to studying the relationship between economics and human biology. Sven Wilson highlights the important links between obesity and family economics, and Jason Aimone and Daniel Houser map the newly-emerging field of neuroeconomics. This field is particularly concerned with the impact of neurofunctioning on economic behaviours and processes. Aimone and Houser illustrate this theme with particular reference to the study of preferences and decision-making.

The final section of the volume is entitled ‘Regional Studies’. This section consists of six chapters with varying foci. Two of the chapters deal primarily with the United States. Lee Craig summarises recent thinking on what has come to be known as the ‘antebellum puzzle’ – namely, the puzzle of ‘shrinking heights’ in the decades before and immediately after the American Civil War. Although some authors have challenged the existence of this puzzle, Craig argues that it does exist and that it can be explained by the impact of growing inequality on the consumption of nutrients by more disadvantaged sections of the population.<sup>1</sup> Platt Boustan and Robert Margo take both a broader and more long-term view of changes in the relative health of African Americans. Although significant differences remain, they argue that the health divide between ‘white’ and ‘black’ America has narrowed significantly over the course of the last century. Alexander Moradi and Kalle Hirvonen explore a different ‘puzzle’ – the relatively tall heights of adults achieved by low-income African countries. They argue that much of this can be attributed to relatively high rates of catch-up growth among African children during adolescence, although they admit that the reasons behind this remain elusive.

The book’s remaining chapters offer more general surveys of anthropometric trends in East Asia, Latin America and southern Europe respectively. Jong Schwegendiek compares the anthropometric history of China, Japan and the two Koreas. In addition to highlighting remarkable differences between the heights of North and South Koreans, he argues that other changes can be attributed to variations in both economic performance and dietary preference. Moramay López–

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<sup>1</sup> Some authors have argued the decline in the heights of men born in the decades before the US Civil War can be attributed to the impact of selection effects on the representativeness of height samples (Bodenhorn, Guinnane and Mroz 2017). However, these claims have themselves been hotly contested (see e.g. Zimran 2015; Komlos and A’Hearn 2016).



Alonso takes a very long-run view of changes in the average height and weight of people in different parts of Latin America since pre-Columbian times, whilst paying particular attention to recent trends in obesity. Brian A'Hearn examines the main trends in the average heights of people throughout southern Europe. He argues that there was quite a close fit between economic indicators and height before 1850, but that this has been rather less true of the post-1850 period. He also highlights some of the cross-sectional variations in the heights of different southern European populations in the present day, and suggests that 'genetic differences' may be contributing to these (p. 783).

Although a number of authors have described the 'disconnect' between economic and biological indicators as 'puzzling', it does not have to be so. One of the original motivations for the introduction of anthropometric approaches into the study of economic history was a desire to move beyond the use of purely economic indicators to measure 'wellbeing' (see e.g. Floud 1984; Steckel 1992). Seen from this point of view, anthropometric variables were not simply an alternative to be employed when more conventional indicators were lacking. They also embodied an alternative conception of wellbeing which took account, not only of factors such as real wages, but also the impact of environmental and nutritional influences on the quality of human existence.

Having said this, this volume also demonstrates just how fruitful the dialogue between economics and human biology has now become. It has encouraged economists and economic historians to think more carefully, not only about the ways in which we conceptualise living standards, but also about the ways in which we utilise biological data. It has also stimulated new research into the relationships between biology (and psychology) and economic decision-making. Hopefully, it has also made biologists more aware of the economic, social and even historical contexts within which biological processes occur.

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